

Having thus described the preferred embodiment, the invention is now claimed to be:

1. A cathode assembly comprising:
  - a base;
  - a filament mounted to the base for delivering a stream of electrons;
  - 5 a deflector carried by the base for deflecting the electrons or focusing the electrons into a beam;
  - an insulator for electrically insulating the deflector from the base, the insulator defining a bore; and
  - 10 a rod connected with the deflector adjacent a first end of the rod, the rod being received within the insulator bore.
2. The cathode assembly of claim 1, further including:
  - a second deflector supported by the base;
  - a second insulator for electrically insulating the 5 second deflector from the base, the second insulator defining a second bore; and
  - a second rod, connected with the deflector adjacent a first end of the second rod, the second rod being received within the second insulator bore.
3. The cathode assembly of claim 1, further including:
  - another insulator for electrically insulating the deflector from the base, the other insulator defining 5 another bore; and
  - another rod, connected with the deflector adjacent a first end of the rod, the other rod being received within the other insulator bore.

4. The cathode assembly of claim 1, further including a tube, mounted in the bore, which receives the rod.

5. The cathode assembly of claim 1, wherein the base defines a passageway, a first end of the insulator being received in the passageway.

6. The cathode assembly of claim 5, wherein the passageway includes a first portion and a second portion, the second portion having a larger internal diameter than the first portion such that a shoulder is defined between the first and second portions, the insulator having a portion of larger diameter than the first portion of the passageway which is received in the second portions of the passageway.

7. The cathode assembly of claim 1, wherein the deflector defines a socket which receives a second end of the insulator.

8. The cathode assembly of claim 7, wherein the deflector defines a hole which extends into the deflector from the socket, the hole receiving the first end of the rod.

9. The cathode assembly of claim 8, wherein the deflector socket has a larger diameter than a diameter of the insulator, such that a gap is defined between the socket and a side wall of the deflector.

10. The cathode assembly of claim 1, wherein the deflector defines a well which receives the first end of the rod.

11. The cathode assembly of claim 1, wherein the insulator has a metallized coating on a first portion thereof, the insulator being brazed or welded to the base at the metallized coating.

12. The cathode assembly of claim 1, wherein the rod electrically connects the deflector with a source of electrical potential for biasing the deflector.

13. The cathode assembly of claim 1, wherein the deflector is configured and positioned to eliminate a direct line of sight for the flow of vaporized filament material between the filament and the insulator.

14. The cathode assembly of claim 6, wherein the second portion of the passageway is adjacent an upper end of the base.

15. The cathode assembly of claim 2, wherein the first ends of the first and second rods are connected by a connecting member and wherein the connecting member is connected with the deflector.

16. An x-ray tube comprising:  
an envelope which encloses an evacuated chamber;  
a cathode assembly disposed within the chamber for providing a source of electrons, the cathode assembly  
5 including:

10 a base supported in the envelope,  
a filament mounted to the base for providing the electrons,  
a deflector carried by the base for deflecting the electrons or focusing the electrons into a beam,  
an insulator for electrically insulating the deflector from the base, the insulator defining an internal bore, and

15           a rod connected with the deflector adjacent  
a first end of the rod, the rod being received  
within the insulator bore; and  
an anode disposed within the chamber positioned to be  
struck by the electrons and generate x-rays.

17. A method of assembling a cathode assembly  
comprising:

- a) attaching at least one rod to at least one deflector;
- 5       b) attaching a metal tube in an insulator to define a bore for receiving the rod;
- c) attaching the insulator to a base;
- d) attaching a filament assembly to the base;
- e) sliding the rod into the tube to mount the deflector to the base; and
- 10      f) attaching the rod to the tube.

18. The method of claim 17, wherein the step of mounting the rod to the deflector includes positioning the first end of the rod in a hole within the deflector and brazing the rod to the deflector.

19. The method of claim 17, wherein the step of attaching the insulator to the base includes:

      metalizing one end of an outer surface of the insulator;

5       positioning the metalized end of the insulator in a bore in the base; and

      brazing the metalized surface of the insulator to the base.

20. The method of claim 17, wherein the step of attaching the tube in the insulator includes:

      inserting the tube in a bore in the insulator;  
      welding the tube to the insulator.

21. The method of claim 20, wherein the step of attaching the rod to the tube includes:  
crimping the rod and the tube together.

22. The method of claim 17, further including:  
as the rod is slid into the tube, setting and aligning the deflector;  
performing the step of attaching the rod to the tube  
5 after the deflector has been set in a preselected position with a preselected alignment.

23. The method of claim 17, wherein:  
the step of attaching the insulator to the base includes inserting the insulator into a bore from a first surface of the base;  
5 the step of attaching the filament assembly to the base includes inserting a filament insulator into a second bore from the first surface of the base; and  
brazing the insulator and filament insulator to the base in a single brazing step.